DOCUMENT CHANGE REQUEST FORM

Requested By: QMS Team **Date:** March 8, 2017

Department: O. & F. Division

Type of Change:

✓ **Edit Existing Document** **Create New Document** **Delete Document**

Changes Requested:

1. Element 6 Drinking Water System Process Description

Justification for Changes:

The following section is being revised to update the Town of Fort Frances Drinking Operation Plan.

1. a) Page 17 – subsection 6.4 Threats to Raw Water Quality: First paragraph, last line - Grammar.

   b) Page 18 - subsection 6.4 Threats to Raw Water Quality: Remainder of section wording requires clarification. Due to the source water being shared by Canada/USA the potential affects to raw water quality may not be known at the time or future development could take place.

   c) Page 19 - subsection 6.4 Threats to Raw Water Quality: Second paragraph, second sentence – Word spelling and fifth paragraph, first sentence – missing a word.

Proposed Changes:

1. a) Page 17 – subsection 6.4 Threats to Raw Water Quality: First paragraph, last line – removed the word "on". To read "…impact raw water quality."

   b) Page 18 - subsection 6.4 Threats to Raw Water Quality: Remainder of section reworded as attached.

   c) Page 19 - subsection 6.4 Threats to Raw Water Quality: Second paragraph, second sentence - "Poly electrolyte" to read "Polyelectrolyte" and fifth paragraph, first sentence – existing wording is "…on the filter effluent, which…" to read "…on the filter effluent **line**, which…"

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Approval:

QMS Representative: [signature] **Date:** 22-03-2017

Comments:

6 Drinking Water System Process Description

6.1 Introduction

The Town of Fort Frances water supply system provides a potable water supply to the residents and businesses of the Town of Fort Frances. Connected to the Town's water system is Couchiching First Nation, which borders the northeast limits of the Town, Lakeview Trailer Court and Walleye Trailer Court. The Owner and operating authority for each subsystem is as follows:

a) Couchiching First Nation Reserve: Partnership – Couchiching First Nation and Federal Government.
b) Lakeview Trailer Park: Cheryl Elaine Armstrong
c) Walleye Trailer Park: Walleye Trailer Park Ltd. (Carl Felix and Norma May Piotrowski).

The facility consists of a Class III conventional design water treatment plant having an approved capacity of 17,000 m^3/day and a Class II distribution system both owned and operated by the Town of Fort Frances.

6.2 Source Water

The water treatment plant draws water from Upper Rainy River. Raw water characteristics are as follows:

pH range from 6.0 – 7.6
Temperature range from 0.5 – 24 Celsius
Colour range 5 – 60 True Colour Units
Turbidity range 1 – 16 N.T.U.

6.3 Events Affecting Source Water Quality

Spring and fall turnover of the river water affect plant operations for a short duration, which can be corrected by making the appropriate physical and/or chemical adjustments to the elevated levels of turbidity in the treatment process. Also due to the cold water temperature during the winter months some minor chemical adjustments may be necessary.

6.4 Threats to Raw Water Quality

Based on a source or raw water protection pre-screening survey completed by Cambium Environmental Inc. in October of 2006, there are a few potential hazards or risks near the Water Treatment Plant's (WTP) source water intake which could negatively impact ~~on~~ raw water quality.

~~The Area of Interest (as defined by MOE) contains a few petroleum fuel storage tanks, as well as an active railway line where railcars containing inorganic and organic toxic chemicals and compounds cross the Ranier Bridge on a regular basis.~~
~~The railway line is approximately 400 meters northeast of the WTP's raw water intake. Should a derailment take place within the area of interest there is a potential for contaminating the Town's raw water supply. Also on the USA side of the Ranier Bridge, railway ties are being stored within the area of interest that poses a risk to raw water quality.~~

The "Area of Interest" (as defined by the MOECC) identifies items, which could potentially affect the raw water quality to the Town's water treatment plant. They are as follows:

1. petroleum fuel storage tanks
2. an active railway line where railcars may contain inorganic and organic toxic chemicals and compounds
3. railway tie storage - USA side by the Ranier Bridge
4. residential home heating products (furnace oil) and improperly engineered septic system

The railway line, which crosses into the USA, via Ranier Bridge is approximately 400 metres northeast (upstream) of the plant's raw water intake.

With Rainy River bordering both Canada and USA there could be other potential risks that may not be known at this time or future development could take place. With little or no control as to what takes place on the USA side of the border that could pose a risk to the raw water quality in the future; once the Town becomes aware of a potential risk item(s) a risk assessment will be completed (Element 8) and the Operational Plan amended accordingly.

~~Finally, within the area of interest along both sides of the shoreline there are residential properties where home heating products (furnace oil) and improperly engineered septic system could pose a risk to raw water quality.~~

6.5 System Start Up and Operation

The Water Treatment Plant in Fort Frances is located at 901 Colonization Road East, UTM Coordinates: NAD83, Zone 15, Easting 472938.00m, Northing 5384735.00m.

Raw water is supplied from the upper portion of Rainy River through an intake structure located approximately 190 metres northeast of the Water Treatment Plant. The intake structure is equipped with bar screens to prevent logs and other debris from entering the intake line. The raw water is gravity fed into the plant through a 630mm diameter polyethylene pipe passing through two (2) sets of stainless steel screens before entering the raw water well.

The raw water well is equipped with two (2) 30 horsepower electric motors with vertical turbine pumps with each capable of delivering 100 L/s. Also one (1) 40 horsepower electric motor with vertical turbine, variable speed drive pump capable of providing flows in the range of 40 to 150 L/s. Raw water is pumped from the raw water well to the solid contact clarifiers. En route the raw water passes through a flow meter (MagMeter), which maintains an accurate flow measurement as well as integrates with the operational control of the chemical feed pumps. Liquid alum is introduced to the raw water through injection points then passes through an inline flash mixer where rapid mixing occurs before flowing into the clarifiers.

The alum-water solution splits off into two (2) separate lines before entering the clarifiers. ~~Poly electrolyte~~Polyelectrolyte is added and rapidly mixed to promote the formation of floc masses. Settling of the floc particles in the process water occurs forming a sludge blanket. The sludge blanket acts as a filter media where water flowing up through the blanket works like a finely meshed net catching other smaller particles. The processed water at the top of the clarifiers flows into collector flumes to the filter influent flumes to the four (4) dual media gravity filters.

The sludge blanket in each clarifier is on an automatic blow-down controlled through the computer control system. Operators inspect the sludge blanket at least once per day and can increase/decrease the blow-down to maintain an optimum sludge blanket in the clarifiers.

The dual media filters are made up of a top layer of anthracite, 500 mm thickness while the filter media below is silica sand, 400 mm thick. The processed water is carried over the filter media where suspended solids are removed as it gravity flows through the media.

Each of the four (4) filters is equipped with a turbidity meter installed on the filter effluent line, which are alarmed in case of media breakthrough or an upset in process. Periodically the filter media will need to be backwashed to remove/flush out the suspended particles.

The processed water flows to the contact chamber, located between the two (2) reservoir cells or clear wells. In the contact chamber chlorine, soda ash and hydrofluorosilic acid (fluoride) is added. The contact chamber is baffled to enhance proper mixing and contact time for the chlorine entering the reservoirs or clear wells.

The treated water then enters clear wells (two wells) located beneath the Water Treatment Plant main floor. Clear Well No. 1 and No. 2 have a capacity of 2565 m^3 and 1465m^3, respectively. Treated water from the clear well is pumped into the distribution system through the four high lift vertical turbine pumps. Each pump is equipped with electric motors. High lift pump No. 1 and No. 4 have 60 horsepower variable speed drive